UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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C. DOUGLASS **THOMAS** and ALAN E. THOMAS
Junior Party
(Patent Nos. 5,974,557; 6,216,235; 6,487,668)[1]

v.

JACK D. **PIPPIN**
Senior Party
(Application 10/464,482)[2]

_____

Patent Interference No. 105,802 (JL)
(Technology Center 2100)

_____

Before JAMESON LEE, MICHAEL R. ZECHER, and JUSTIN T. ARBES,
Administrative Patent Judges.

ARBES, *Administrative Patent Judge.*

Judgment – Merits – Bd. R. 127

_____

[1] Patents 5,974,557; 6,216,235; and 6,487,668 have been accorded the benefit of
Application 08/262,754, filed June 20, 1994, now Patent 5,752,011. The real
party in interest is IpVenture, Inc. Paper 12.
[2] Filed June 19, 2003. Accorded the benefit of Application 08/124,980, filed
September 21, 1993. The real party in interest is Intel Corporation. Paper 4.

In a concurrent paper, Thomas's Motion 1 (Paper 29) seeking to designate certain claims of Thomas's involved patents as not corresponding to the count has been denied. There are no other pending motions in this interference. Thomas also indicated that as the junior party, it would not be filing a priority motion. Paper 25 at 2, 7. As such, Thomas concedes priority with respect to any claim left as corresponding to the count after consideration of Thomas's motion to designate claims as not corresponding to the count. *Id*. Accordingly, as Thomas's Motion 1 has been denied and all of Thomas's involved claims correspond to the count, it is now appropriate to enter judgment against party Thomas.

It is

ORDERED that judgment with respect to Count 1 is entered against junior party C. DOUGLASS THOMAS and ALAN E. THOMAS;

FURTHER ORDERED that claims 1-47 of junior party's involved Patent 5,974,557; claims 1-54 of junior party's involved Patent 6,216,235; and claims 1-52 of junior party's involved Patent 6,487,668, which correspond to Count 1, are cancelled;

FURTHER ORDERED that the parties shall note the requirements of 35 U.S.C. § 135(c) and Bd. R. 205; and

FURTHER ORDERED that a copy of this judgment shall be entered into the files of Patents 5,974,557, 6,216,235, and 6,487,668, and Application 10/464,482.

Interference No. 105,802
Thomas v. Pippin

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C. DOUGLASS **THOMAS** and ALAN E. THOMAS
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(Patent Nos. 5,974,557; 6,216,235; 6,487,668)

v.

JACK D. **PIPPIN**
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(Application 10/464,482)

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Administrative Patent Judges.

ARBES, *Administrative Patent Judge*.

Decision – Motions – Bd. R. 125(a)

1   This interference was declared on April 18, 2011. The sole pending motion

2   is Thomas's Motion 1, which seeks to designate the following claims of

3   Thomas's involved patents as not corresponding to the count:

4   Patent 5,974,557 ("Thomas '557"): claims 24 and 25

5   Patent 6,216,235 ("Thomas '235"): claims 24-36, 41, 42, and 46-54

1   Patent 6,487,668 ("Thomas '668"): claims 1-5, 12-23, and 37-52

2   The remaining claims of Thomas's involved patents, which Thomas has not

3   moved to designate as not corresponding to the count, are:

4   Patent 5,974,557: claims 1-23 and 26-47

5   Patent 6,216,235: claims 1-23, 37-40, and 43-45

6   Patent 6,487,668: claims 6-11 and 24-36

7   Pippin opposes Thomas's Motion 1. Because Thomas fails to demonstrate

8   by a preponderance of the evidence that claims 24 and 25 of Thomas '557,

9   claims 24-36, 41, 42, and 46-54 of Thomas '235, and claims 1-5, 12-23, and 37-

10   52 of Thomas '668 should be designated as not corresponding to the count,

11   Thomas's Motion 1 is *denied*.

12

13   PROCEDURAL HISTORY

14   The parties' initial requests for authorization to file various motions were

15   resolved in an Order dated June 16, 2011. Paper 25. Thomas requested

16   authorization to file a motion to designate its involved claims as not

17   corresponding to the count, citing 113 allegedly distinguishing features of its

18   involved claims. Paper 22. Thomas was ordered to limit its list to a reasonable

19   number of limitations and authorized to file a motion to designate its involved

20   claims as not corresponding to the count only on the basis of numbered features 1,

21   6, 7, 9, 11, 12, 14, 15, 17, 18, 19, 21, 24, 86, 93, and 98 in Thomas's list. Paper

22   25 at 6. The Order specifically noted that the motion "must account for not just

23   the count as prior art, or just the prior art references of record in either party's

24   involved cases, but also any prior art otherwise known to party Thomas as well as

1   the level of ordinary skill in the art." Paper 25 at 6. The Order also required

2   Thomas to set forth the closest prior art feature known to Thomas and the closest

3   known feature within the level of ordinary skill in the art, giving specific

4   examples of what should be provided for features 1 and 6. Paper 25 at 6-7.

5   In a subsequent Order, Thomas also was authorized to rely on feature 46 to

6   support the attempt to designate claims 12 and 49 of Thomas '668 as not

7   corresponding to the count; on features 62 and 63 to support the attempt to

8   designate claim 4 of Thomas '235 as not corresponding to the count; on feature

9   67 to support the attempt to designate claim 7 of Thomas '235 as not

10   corresponding to the count; and on feature 69 to support the attempt to designate

11   claim 24 of Thomas '235 as not corresponding to the count. Paper 27 at 2-3.

12   All other requests for motions by the parties were either dismissed or

13   denied. Paper 25 at 3-7. Thomas also indicated that as the junior party, it would

14   not be filing a preliminary statement or priority motion. Paper 25 at 2, 7. Thus,

15   Thomas's Motion 1 is the only pending motion in this interference.

16

17   FINDINGS OF FACT

18   The following findings of fact are supported by a preponderance of

19   evidence.

20   1.   Junior party Thomas is involved in this interference on the basis of three

21   patents: Patent 5,974,557; Patent 6,216,235; and Patent 6,487,668.

22   2.   Senior party Pippin is involved in this interference on the basis of

23   Application 10/464,482, filed June 19, 2003.

24   3.   Thomas's real party in interest is IpVenture, Inc. Paper 12.

1   4.   Pippin's real party in interest is Intel Corporation. Paper 4.

2   5.   The sole count in this interference is Count 1, which is defined as:

3   Claim 34 of Pippin's Application 10/464,482

4   6.   Claim 34 of Pippin's Application 10/464,482 reads as follows:

5   34.   A computer system comprising:

6   an active cooling device;

7   a microprocessor comprising:

8   a register storing a register value corresponding to a
9   threshold temperature;

10   a programmable thermal sensor receiving the register
11   value, wherein the programmable thermal sensor generates a first
12   interrupt signal if a microprocessor temperature exceeds the
13   threshold temperature,

14   wherein the active cooling device is activated in response to
15   the interrupt signal, and

16   wherein the active cooling device comprises a fan; and

17   clock circuitry for providing a clock signal for the
18   microprocessor,

19   wherein a frequency of the clock signal is reduced in response
20   to the first interrupt signal.

21

22   *The Thomas Involved Patents*

23   7.   The Thomas involved patents disclose that "[t]he second embodiment is

24   particularly advantageous for portable computing devices because it

25   conserves battery life by using a sleep clock when no processing is

26   needed." *E.g.*, Thomas '557, col. 4, l. 66-col. 5, l. 1.

1   *Sheets (Patent 4,670,837)*

2   8.   Sheets discloses determining the current rate of required microprocessor

3   activity and varying the clock frequency of the microprocessor based on

4   that rate. Abstract; col. 1, ll. 45-54; col. 3, ll. 18-21.

5   9.   As described in Sheets, the "present invention is directed to reducing the

6   amount of energy drawn by system 100 from . . . a [Direct Current] DC

7   source," such as a battery. Col. 2, ll. 37-43.

8   10.   Sheets discloses: "[Voltage-controlled oscillator (VCO) 102] gradually

9   adjusts the frequency of the clock signal transmitted to microprocessor 101

10   to the computed frequency in response to the digital word. Reducing the

11   clock frequency reduces the power consumed by microprocessor 101 and,

12   by reducing the required access rate to the associated devices, i.e., ROM

13   107, RAM 108, and I/O port 109, also reduces the power consumed by

14   those devices. The power reduction is substantially directly proportional to

15   the reduction of the clock frequency. For example, a frequency reduction

16   from 20 megahertz to 10 megahertz will result in a saving of approximately

17   50%." Col. 2, l. 65-col. 3, l. 8.

18

19   *Georgiou (Patent 5,189,314)*

20   11.   Georgiou discloses detecting processor activity and varying the clock

21   frequency of the processor based on that activity. Abstract; col. 2, ll. 10-

22   20, 40-41.

23   12.   As described in Georgiou, "[i]n accordance with this invention, heat

24   production is controlled in accordance with needs through changes in clock

1   rate (i.e., by slowing down the clock rate when a circuit is idling), in order

2   to make it possible to speed up the clock rate when performing either

3   special critical work or useful work in general." Col. 2, ll. 10-16.

4   13.   Georgiou discloses that "[w]hen a circuit is switched to a lower clock rate,

5   there is a heat generation savings. Given a certain heat dissipation capacity

6   (based on the characteristics of the chip and package), it is possible to

7   switch the clock to a higher rate, if enough heat savings have been

8   accumulated." Col. 2, ll. 20-25; col. 3, ll. 33-38.

9

10   *Pippin '578 (Patent 5,838,578)*

11   14.   Application 08/660,016, which issued as Pippin '578, was filed on June 6,

12   1996.

13   15.   Pippin '578 is a continuation of application 08/124,980, filed on

14   September 21, 1993.

15   16.   Pippin '578 issued on November 17, 1998.

16   17.   Pippin '578 discloses generating a first interrupt signal based on the

17   temperature of a microprocessor exceeding a first threshold temperature,

18   activating a fan and reducing clock frequency in response to the first

19   interrupt signal, and programming a new, higher threshold temperature in

20   response to the first interrupt signal. Col. 12, ll. 24-51.

21   18.   Pippin '578 discloses generating a second interrupt signal based on the

22   temperature of the microprocessor exceeding the new, higher threshold

23   temperature, and further reducing clock frequency in response. Col. 12,

24   ll. 51-54.

1   19.   Pippin '578's two-stage configuration "provides close loop control of the

2   microprocessor system clock frequency, thereby automatically reducing the

3   temperature when overheating occurs." Col. 12, ll. 54-58.

4

5   *Swamy (Patent 5,623,594)*

6   20.   Swamy discloses an "overtemperature detection circuit" that takes

7   "periodic readings" of a processor's operating temperature to determine

8   whether the temperature exceeds a "predetermined maximum allowed

9   temperature." Col. 7, ll. 10-28; col. 2, ll. 30-40.

10 21.   Swamy discloses sending a signal to various components to attempt to cool

11   the processor if the predetermined temperature is exceeded. "For example,

12   the signal may instruct the fan 240 to turn on or increase speed if already

13   on. Alternatively, the signal may send a message to the user through the

14   video subsystem 280, or it may instruct the [Central Processing Unit] CPU

15   clock 250 to decrease the operational speed of the CPU 260. As a last

16   resort, the signal may instruct the CPU 260 to save the document presently

17   being worked on to the disk 320 and turn the power to the [Personal

18   Computer] PC off." Col. 7, ll. 34-41; col. 2, ll. 40-51.

19 22.   Swamy discloses that "[t]he component to which the signal is sent may

20   depend on how extreme the temperature of the CPU 260 has become and

21   how long the temperature has been at the excessive level." Col. 7, ll. 30-

22   33.

23 23.   Swamy discloses that the signals sent in an attempt to cool the processor

24   "can be programed to occur in several different combinations." Col. 6, l.

1   64-col. 7, l. 1.

2   *Neal (Patent 5,483,102)*

3   24.   Neal discloses the thermal management of a semiconductor device and, in

4   particular, reducing an internal clock frequency of the semiconductor

5   device upon receiving a first signal indicating fan failure and/or a second

6   signal indicating thermal overload. Col. 1, ll. 9-14.

7   25.   Neal discloses that fans for cooling semiconductor devices commonly

8   employ a chip set to generate a motor pulse at a given frequency to drive a

9   fan motor. Col. 5, ll. 31-33. By altering the frequency of the motor pulse,

10   Neal discloses that the fan is driven at various speeds, thereby increasing or

11   decreasing the fan's airflow production. Col. 5, ll. 33-36.

12

13   *Dinh (Patent 5,526,289)*

14 26.   Dinh discloses a fan cooling subsystem for a personal computer wherein

15   the speed of the fan is adjustable based on the temperature within the

16   housing of the personal computer. Col. 1, ll. 10-13.

17 27.   Dinh discloses that it may be desirable to have two speeds for a fan: (1)

18   when the computer's elements are operating at a low temperature, the fan

19   blows quietly at a low speed, and (2) when the computer's elements are

20   hot, the fan blows rapidly and loudly at a high speed. Col. 1, ll. 29-35.

21 28.   Dinh discloses that "there is a need for a fan subsystem which can increase

22   the fan speed proportionally to the increase in the temperature of the

23   computer's elements. Such a fan subsystem would evenly match the

24   temperature inside the computer with the fan speed necessary to cool the

1   system. Thus, a computer system with such a fan subsystem would provide

2   the most efficient trade off between fan speed and sound quality." Col. 1,

3   ll. 44-51.

4
5   ANALYSIS

6   Thomas's Motion 1 seeks to designate claims 24 and 25 of Thomas '557,

7   claims 24-36, 41, 42, and 46-54 of Thomas '235, and claims 1-5, 12-23, and 37-

8   52 of Thomas '668 as not corresponding to the count. Thomas as the moving

9   party bears the burden of proof to establish entitlement to the relief requested. 37

10   C.F.R. § 41.121(b). A claim corresponds to a count if the subject matter of the

11   count, treated as prior art to the claim, would have anticipated or rendered

12   obvious the subject matter of the claim. 37 C.F.R. § 41.207(b)(2). Thus, unlike

13   other situations, such as a civil action for patent infringement where the moving

14   defendant asserts that the claimed subject matter is anticipated or obvious,

15   Thomas as the moving party bears the burden of establishing a negative, i.e., that

16   the subject matter of the claims is *not* anticipated or obvious in light of the count

17   and any other applicable prior art.

18   It is evident that the count, if treated as prior art, would not have

19   anticipated any of the claims which Thomas seeks to designate as not

20   corresponding to the count. Thus, the proper analysis is one of obviousness per

21   *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17-18 (1966). The

22   pertinent factual inquiries are (1) the scope and content of the prior art, (2) the

23   differences between the claimed invention and the prior art, (3) the level of

24   ordinary skill in the art, and (4) any objective evidence of nonobviousness. *Id.* at

1   17. The obviousness conclusion is reached from the perspective of the

2   hypothetical person having ordinary skill in the art who is presumed to be aware

3   of all pertinent prior art. *Standard Oil Co. v. American Cyanamid Co.*, 774 F.2d

4   448, 454 (Fed. Cir. 1985). Also, a person of ordinary skill in the art has ordinary

5   creativity and is not an automaton. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398,

6   421 (2007). If a technique has been used to improve one device, and a person of

7   ordinary skill in the art would recognize that it would improve similar devices in

8   the same way, using the technique is obvious unless its actual application is

9   beyond his or her skill. *Id.* at 417.

10   To prevail in its motion, Thomas must demonstrate by a preponderance of

11   the evidence that each of the claims it seeks to designate as not corresponding to

12   the count would not have been obvious to one of ordinary skill in the art, given

13   the subject matter of the count as prior art and any other applicable prior art.

14   Thomas in its motion identifies a number of features in its claims that allegedly

15   distinguish the count and other prior art, and groups the involved claims

16   accordingly. We address each group of claims in turn.

17   For all of the reasons discussed below, Thomas has not satisfied its burden

18   of proof that the collective differences between each claim it seeks to designate as

19   not corresponding to the count and the subject matter of the count are such that

20   the claim would not have been obvious over the count and other applicable prior

21   art.

22

1   *Feature 6 – Varying Clock Frequency Based on*
2   *Processor Activity and Temperature*

3   Thomas argues that claims 24 and 25 of Thomas '557, claims 30, 31, 41,

4 42, 50, 53, and 54 of Thomas '235, and claims 1-5, 18, 19, and 37-48 of

5 Thomas '668 recite the feature of varying clock frequency based on both

6 processor activity and temperature. For example, claim 1 of Thomas '668 recites

7 a clock control unit operating to "alter the clock frequency of the clock signal in a

8 gradual and dynamic manner based on the temperature of said processing unit as

9 monitored by said temperature sensor and on the activity of said processing unit

10 as monitored by said activity detector." Thomas contends that the involved

11 claims would not have been obvious over the count and other prior art based on

12 this feature.

13   At the outset, we note that claims 30 and 41 of Thomas '235 and claim 18

14 of Thomas '668 recite varying *fan speed*, not clock frequency, based on processor

15 activity and temperature. Thomas acknowledges that these claims do not have

16 feature 6.[1] Paper 38 at 18 (admitted fact 77). Accordingly, the analysis below

17 applies to the remaining claims 24 and 25 of Thomas '557, claims 50, 53, and 54

18 of Thomas '235, and claims 1-5, and 37-48 of Thomas '668.

19   The count discloses varying clock frequency based on temperature, not

20 processor activity. Thomas, however, admits in the background section of its

21 involved patents that clock frequency variation based on processor activity was

22 known at the time. *See, e.g.*, Thomas '557, col. 1, ll. 18-20 ("It is also known to

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[1] Claim 30 of Thomas '235 includes feature 69 and claim 18 of Thomas '668
includes feature 46, however, as discussed below.

1   suspend or slow a computer's processor (e.g., microprocessor, CPU) when the

2   processor is not actively processing. . . . [In one exemplary reference,] the sleep

3   mode either stops the clock or slows it to 4 MHz."); Paper 38 at 18 (admitted fact

4   80). Thus, clock frequency variation based on processor activity and based on

5   temperature were both old and well known individually in the prior art. The issue

6   before us is whether the claims reciting the combined feature of varying clock

7   frequency based on processor activity *and* temperature would have been obvious

8   to one of ordinary skill in the art given the count itself and other applicable prior

9   art.

10   Thomas points to testimony from its expert, Dr. Douglas P. McNutt,

11   identifying Nakagawa (Japanese Patent Application 1990-83720, Exhibit 2010) as

12   "the closest known prior art with respect to the feature of frequency reduction"

13   and Kenny (Patent 5,287,292) as "the closest prior art known with respect to the

14   feature of activity monitoring." Paper 29 at 13-15. We disagree that Nakagawa

15   and Kenny are the closest prior art references for purposes of feature 6. Indeed,

16   Thomas admits that "[t]here is no activity detector in Nakagawa." Paper 29 at 13.

17   Nakagawa therefore cannot be the closest prior art for claims including the feature

18   of varying clock frequency based on processor activity and temperature.

19   The prior art references cited by Pippin – Sheets and Georgiou – are more

20   relevant to the involved claims reciting feature 6, and reflect the level of ordinary

21   skill in the art at the time. *See In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir.

22   1995) (agreeing with the Board's conclusion that "the level of ordinary skill in

23   the art . . . was best determined by appeal to the references of record"). Sheets

24   discloses detecting processor activity and reducing clock frequency in times of

1   low activity. Sheets, col. 1, ll. 45-54 ("determining the processing load presented

2   to the system and then reducing the clock frequency at which the system is

3   driven, during times when the processing load is reduced"). By doing so, Sheets

4   reduces the consumption of power from a battery. Sheets, col. 2, ll. 37-43; col. 2,

5   l. 65-col. 3, l. 8 ("[r]educing the clock frequency reduces the power consumed by

6   microprocessor 101"). As Pippin points out, this is the same reason given in

7   Thomas's involved patents for varying clock frequency based on processor

8   activity. *See* Paper 35 at 14; Thomas '557, col. 4, l. 66-col. 5, l. 1 ("The second

9   embodiment is particularly advantageous for portable computing devices because

10   it conserves battery life by using a sleep clock when no processing is needed.").

11   Georgiou similarly discloses reducing clock frequency in times of low activity to

12   reduce heat generation, and increasing clock frequency "if enough heat savings

13   have been accumulated." Georgiou, Abstract; col. 2, ll. 8-28; col. 3, ll. 33-38.

14   Sheets and Georgiou therefore teach varying clock frequency based on processor

15   activity to (1) conserve battery life, and (2) reduce heat generation in times of low

16   activity and increase performance speed when possible. Dr. McNutt admitted that

17   clock frequency variation was known to achieve both benefits. *See* Paper 35 at

18   13.

19   Thomas has not presented sufficient and credible evidence that a person of

20   ordinary skill in the art would not have found it obvious, in light of the count and

21   the other prior art discussed above, to vary clock frequency based on both

22   processor activity and temperature. Combining the known feature of clock

23   frequency variation based on processor activity (as described in Sheets and

24   Georgiou) with the known feature of clock frequency variation based on

13

1   temperature (as described in the count) to arrive at the subject matter of the

2   involved claims would have been a simple combination of familiar elements that

3   yields predictable results. *See KSR*, 550 U.S. at 416. A person of ordinary skill

4   also would have had reason to do so to conserve battery life, reduce heat

5   generation, and improve performance speed as taught by Sheets and Georgiou.

6   Further, we see no reason why varying clock frequency based on both factors

7   would have been uniquely challenging or otherwise beyond the level of skill of an

8   ordinarily skilled artisan. *See id.* at 421 (an improved product in the art is

9   obvious if that "product [is] not [one] of innovation but of ordinary skill and

10   common sense"); *Leapfrog Enters., Inc. v. Fisher-Price, Inc.*, 485 F.3d 1157,

11   1161-62 (Fed. Cir. 2007). One with ordinary skill in the art is a person of

12   ordinary creativity, not an automaton. *KSR*, 550 U.S. at 421.

13   Further, Thomas's arguments regarding the scope of the prior art, including

14   the count, are unpersuasive. Thomas argues that the computer system disclosed

15   in the count is limited in various respects such that it would not have been

16   obvious to a person of ordinary skill to combine it with prior art disclosing

17   activity detection and clock frequency variation based on processor activity.

18   Paper 29 at 7-13; Paper 38 at 5-6. For instance, Thomas contends that based on

19   the description in Pippin's specification, the "programmable" thermal sensor of

20   the count functions like an on-off switch in outputting a single "interrupt signal"

21   if the temperature exceeds a threshold, whereas the "temperature sensor" recited

22   in Thomas's involved claims is capable of *measuring* temperature and performing

23   actions based on that *measured* temperature. Paper 29 at 7, 10-11; Paper 38 at 5-

24   6. We disagree that the scope of what the count would have suggested to a person

14

1   of ordinary skill in the art is so limited, as it is the count itself rather than Pippin's

2   specification that is deemed prior art for purposes of our analysis. A person of

3   ordinary skill in the art also is presumed to have skills apart from what a prior art

4   reference explicitly says. *See KSR*, 550 U.S. at 418. Further, even assuming that

5   the count's thermal sensor is limited in the manner argued by Thomas, Thomas

6   has not adequately explained why the alleged limitations would prevent a skilled

7   artisan from using his or her ordinary skill to combine it with other prior art. *See*

8   *In re Sneed*, 710 F.2d 1544, 1550 (Fed. Cir. 1983) ("[I]t is not necessary that the

9   inventions of the references be physically combinable to render obvious the

10   invention under review."); *In re Keller*, 642 F.2d 413, 425 (CCPA 1981) ("The

11   test for obviousness is not whether the features of a secondary reference may be

12   bodily incorporated into the structure of the primary reference. . . . Rather, the test

13   is what the combined teachings of those references would have suggested to those

14   of ordinary skill in the art.").

15   As to Sheets and Georgiou specifically, Thomas argues that the references

16   are cumulative and were considered during prosecution of Thomas '235 and

17   Thomas '668. Paper 38 at 6-8. We disagree that the references are cumulative to

18   other references discussed herein. Also, whether the Examiner had considered

19   them during prosecution of Thomas '235 and Thomas '668 does not change our

20   view with respect to their disclosure. The references are indicative of the level of

21   ordinary skill in the art at the time. Thomas further argues that Sheets and

22   Georgiou relate only to reducing clock frequency when processor activity is low

23   (e.g., when the processor is "idle"), and therefore would not have suggested

24   Thomas's involved claims directed to a computer that is "working hard (a heavy

1   processing burden) and in danger of overheating." Paper 38 at 7-9. We do not

2   see, and Thomas has not pointed us to, any limitation in the claims requiring a

3   specific, particularly "heavy" burden on the processor, or any reason why the

4   claims would not cover varying clock frequency based on a certain lower activity

5   rate.

6   Thomas has not met its burden to demonstrate by a preponderance of the

7   evidence that the involved claims reciting the feature of varying clock frequency

8   based on both processor activity and temperature would have been nonobvious in

9   light of the count and other applicable prior art.

10

11   *Feature 1 – An Activity Detector Monitoring Activity of a Processing Unit*

12   Claims 46-54 of Thomas '235 recite an "activity detector that monitors

13 activity of said processing unit" and a clock control unit that operates to alter

14 clock frequency based on the activity of the processing unit. Thomas contends

15 that the involved claims would not have been obvious over the count and other

16 prior art based on this feature. Thomas's arguments for feature 1 largely repeat

17 those made with respect to feature 6. *See* Paper 29 at 22-24; Paper 38 at 8-9.

18 Thomas points to the allegedly "restricted control scheme" of the thermal sensor

19 in the count, and cites Dr. McNutt's testimony that Kenny is the closest prior art

20 known for "monitoring processor activity for temperature control." Paper 29 at

21 23.

22   We disagree. As discussed above, activity detection was well known in the

23 prior art, and it would have been well within the skill of a person of ordinary skill

24 in the art to incorporate such functionality into the computer system recited in the

16

1   count so that clock frequency could be varied based on the activity. *See, e.g.,*

2   Thomas '557, col. 1, ll. 18-20; Paper 38 at 3 ("Dr. McNutt agreed . . . that activity

3   detectors . . . were known in the art"), 18 (admitted fact 80). Thus, because we

4   conclude that Thomas has not met its burden to show that the involved claims

5   reciting varying clock frequency based on both processor activity *and*

6   temperature would have been nonobvious, for the reasons discussed above, we

7   likewise conclude that Thomas has not met its burden to show that the involved

8   claims reciting an activity detector monitoring the activity of a processing unit

9   would not have been obvious based on the count and other applicable prior art.

10

11   *Feature 46 – First Activating a Fan if Temperature Exceeds a First Threshold,*
12   *and Then Reducing Clock Frequency if Temperature Exceeds a Second Threshold*

13   Thomas argues that claims 12-23 and 49-52 of Thomas '668 recite the

14   feature of first activating a fan if a first temperature threshold is exceeded, and

15   then reducing clock frequency if a second temperature threshold is exceeded. For

16   example, claim 49 of Thomas '668 recites comparing the temperature of a

17   processor to first and second predetermined temperatures, "activating a cooling

18   fan when the temperature of the processor exceeds the first predetermined

19   temperature," and "reducing operational clock frequency of the processor when

20   the temperature of the processor exceeds the second predetermined temperature."

21   Thomas contends that the involved claims would not have been obvious over the

22   count and other prior art based on this "two-stage cooling approach" of *first*

23   activating a fan if a *first* temperature threshold is exceeded, and *then* reducing

24   clock frequency if a *second* temperature threshold is exceeded. Paper 29 at 20-

1 22. Thomas does not point to any prior art reference as the closest prior art for

2 purposes of feature 46, instead citing Dr. McNutt's testimony that he is not aware

3 of any prior art that would have suggested the involved claims. Paper 29 at 21-

4 22. We are not persuaded by Thomas's arguments.

5   While Thomas does not point to any prior art other than the count itself,

6 we find the references cited by Pippin – Pippin '578 and Swamy – relevant to

7 the involved claims reciting feature 46 and indicative of the level of ordinary

8 skill in the art. Pippin '578 is prior art to Thomas's involved patents under 35

9 U.S.C. § 102(e) because it is a continuation of an application filed on

10 September 21, 1993 (prior to Thomas's admitted benefit date of June 20, 1994)

11 and issued on November 17, 1998.[2] Pippin '578 discloses generating a first

12 interrupt signal based on the temperature of a microprocessor exceeding a first

13 threshold temperature, activating a fan and reducing clock frequency in response

14 to the first interrupt signal, and programming a new, higher threshold temperature

15 in response to the first interrupt signal. Pippin '578, col. 12, ll. 24-51. Then, if

16 the processor heats up more and exceeds the new, higher threshold temperature, a

17 second interrupt signal is generated and the clock frequency is further reduced.

18 Pippin '578, col. 12, ll. 51-54. Thus, the only difference between Pippin '578's

19 two-stage approach and that of the involved claims is that Pippin '578 performs

20 *both* actions (activating a fan and reducing clock frequency) in the first stage,

21 rather than *just* activating the fan. Notably, however, the involved claims do not

22 preclude also reducing clock frequency in the first stage; Pippin '578 therefore

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[2] Thomas in its Reply (Paper 38) did not dispute that Pippin '578 is prior art for purposes of Thomas's motion.

1   discloses the feature that according to Thomas distinguishes over the prior art.

2   　　　　Further, Pippin '578 discloses that its two-stage configuration "provides

3   close loop control of the microprocessor system clock frequency, thereby

4   automatically reducing the temperature when overheating occurs." Pippin '578,

5   col. 12, ll. 54-58. Dr. McNutt also agreed that "the idea of activating a fan

6   followed by reducing clock frequency, if necessary, is disclosed in the Pippin

7   application." *See* Paper 35 at 25.

8   　　　　Swamy similarly describes a multiple-stage process of periodically

9   determining the processor's temperature and *either* activating a fan or reducing

10   clock frequency in response to the processor temperature exceeding

11   predetermined thresholds. Swamy, col. 7, ll. 10-41. Which specific action is

12   taken in a particular circumstance "may depend on how extreme the temperature

13   of the CPU 260 has become and how long the temperature has been at the

14   excessive level," and the actions can be taken in "different combinations."

15   Swamy, col. 6, l. 64-col. 7, l. 1; col. 7, ll. 30-33. Thus, Swamy also teaches a

16   multiple-stage process with the actions (activating a fan and reducing clock

17   frequency) taken in different sequences based on different temperature thresholds.

18   　　　　Thomas has not presented sufficient and credible evidence that a person of

19   ordinary skill in the art would not have found it obvious, in light of the count and

20   the other prior art discussed above, to first activate a fan if a first temperature

21   threshold is exceeded and then reduce clock frequency if a second temperature

22   threshold is exceeded. The count itself discloses performing both actions based

23   on the temperature exceeding a single threshold, and a person of ordinary skill in

24   the art would have known, based on Pippin '578 and Swamy, to perform the

1 actions in sequence based on two threshold temperatures. Doing so would have

2 been a simple and common sense modification yielding predictable results and

3 within the level of skill of an ordinarily skilled artisan. *See KSR*, 550 U.S. at 416.

4 A person of ordinary skill also would have had reason to do so to automatically

5 reduce the processor's temperature when overheating occurs, and to further

6 reduce the processor's temperature when the temperature rises and additional

7 cooling is needed, as taught by Pippin '578. Further, the particular sequence of

8 activating a fan first and then reducing clock frequency would have been a choice

9 among a finite number of known, predictable solutions (i.e., perform one before

10 the other, or perform both at the same time) for a person of ordinary skill in the

11 art.

12   As with the other features discussed above, Thomas's arguments regarding

13 the scope of the prior art (including the count) are unpersuasive. According to

14 Thomas, because the computer system recited in the count generates an interrupt

15 signal based on a single threshold temperature and performs both actions of

16 activating a fan and reducing clock frequency in response to that interrupt signal,

17 "it is not possible to separate these two different actions by time or temperature."

18 Paper 29 at 16-17, 20-22. Thomas also points to the allegedly "specialized

19 nature" and "restricted capabilities" of the sensor disclosed in the count

20 (interpreted in light of the Pippin application) and argues that Pippin did not

21 explain how one of ordinary skill would actually modify the disclosed sensor to

22 perform staggered cooling steps. Paper 38 at 10-12. As explained above,

23 however, the count teaches performing both actions (activating a fan and reducing

24 clock frequency) based on a single threshold temperature, and Pippin '578 and

20

1   Swamy teach performing the actions in sequence based on two thresholds. We

2   see no reason why an artisan possessing ordinary skill who is aware of the prior

3   art would not have been able to modify the sensor of the count, which uses one

4   threshold temperature to perform both actions, to test for two threshold

5   temperatures and perform the actions in sequence. Again, a person of ordinary

6   skill in the art has ordinary creativity and is not an automaton. *KSR*, 550 U.S. at

7   421.

8   Thomas has not met its burden to demonstrate by a preponderance of the

9   evidence that the involved claims reciting the feature of first activating a fan if a

10   first temperature threshold is exceeded and then reducing clock frequency if a

11   second temperature threshold is exceeded would have been nonobvious in light of

12   the count and other applicable prior art.

13

14   *Feature 69 – First Reducing Clock Frequency if Temperature Exceeds a First*
15   *Threshold, and Then Activating a Fan if Temperature Exceeds a Second*
16   *Threshold*

17   Claims 24-36 of Thomas '235 recite a thermal manager that "causes the

18   clocking frequency for said microprocessor to be reduced to provide thermal

19   management when the temperature indication indicates that the temperature of

20   said microprocessor exceeds the first temperature threshold, and activates said fan

21   when the temperature indication indicates that the temperature of said

22   microprocessor exceeds the second temperature threshold." Thus, these claims

23   recite the opposite of feature 69: *first* reducing clock frequency if a first

24   temperature threshold is exceeded, and *then* activating a fan if a second

25   temperature threshold is exceeded. Thomas contends that the involved claims

21

1 would not have been obvious over the count and other prior art based on this

2 feature, and makes arguments similar to those made with respect to feature 69.

3 Paper 29 at 16-19; Paper 38 at 10-13.

4   For the reasons discussed above for feature 46, we disagree with Thomas

5 that a "two-stage cooling approach" involving two temperature thresholds would

6 have been a nonobvious modification to the system disclosed in the count. We

7 also disagree that the particular sequence of reducing clock frequency first and

8 activating a fan second would have been a nonobvious modification. Thomas

9 points to Dr. McNutt's testimony regarding Nakagawa as applicable prior art for

10 purposes of feature 69, but acknowledges that Nakagawa does not use a fan. *See*

11 Paper 29 at 17-18; Paper 38 at 31 (admitted fact 165). Nakagawa therefore

12 cannot be the closest prior art for purposes of claims reciting activating a fan.

13   The prior art references cited by Pippin – Pippin '578 and Swamy – are

14 more relevant to the involved claims reciting the feature of reducing clock

15 frequency first and activating a fan second. Pippin '578 discloses performing the

16 same actions but in the reverse order. Pippin '578, col. 12, ll. 24-54. Swamy

17 contemplates "different combinations" of the two actions, and choosing whether

18 to reduce clock frequency or activate a fan based on "how extreme the

19 temperature of the [processor] has become." Swamy, col. 6, l. 64-col. 7, l. 33.

20 Dr. McNutt also admitted that it was known at the time to "use a fan as a *last*

21 *resort* to cool as a way of conserving power especially for battery-powered

22 computers." *See* Paper 35 at 28 (emphasis added).

23   Thomas has not presented sufficient and credible evidence demonstrating

24 that in light of the count, Pippin '578, and Swamy, the involved claims reciting

1   first reducing clock frequency and then activating a fan would have been

2   nonobvious to a person of ordinary skill in the art. Again, the count itself

3   discloses performing both actions based on the temperature exceeding a single

4   threshold, and a person of ordinary skill in the art would have known, based on

5   Pippin '578 and Swamy, to perform the actions at different times and in different

6   combinations based on two threshold temperatures. Doing so would have been a

7   simple and common sense modification yielding predictable results and within the

8   level of skill of an ordinarily skilled artisan. *See KSR*, 550 U.S. at 416. A person

9   of ordinary skill also would have had reason to do so to reduce temperature while

10   conserving power, as acknowledged by Dr. McNutt. *See* Paper 35 at 28. Further,

11   as with feature 46, the particular sequence of reducing clock frequency first and

12   then activating a fan would have been a choice among a finite number of known,

13   predictable solutions for a person of ordinary skill in the art.

14   Thomas has not met its burden to demonstrate by a preponderance of the

15   evidence that the involved claims reciting the feature of first reducing clock

16   frequency if a first temperature threshold is exceeded and then activating a fan if a

17   second temperature threshold is exceeded would have been nonobvious in light of

18   the count and other applicable prior art.

19

20   *Feature 14 – Multi-Speed Fan*

21   *Feature 17 – Fan Speed Dependent on Temperature*

22   Thomas argues that claims 25, 34, and 36 of Thomas '235 recite the feature

23   of fan speed dependent on temperature (feature 17), and claim 14 of Thomas '668

24   recites the features of both a multi-speed fan (feature 14) and fan speed dependent

1   on temperature (feature 17). For example, as to feature 14, claim 14 of Thomas

2   '668 recites a "variable speed fan." As to feature 17, claim 25 of Thomas '235

3   recites that "the speed of said fan is dependent upon the extent that the

4   temperature of said microprocessor exceeds the second temperature threshold."

5   Thomas contends that the involved claims would not have been obvious over the

6   count and other prior art based on these features.

7   *Feature 14:* We begin our discussion with feature 14, and note that the

8   count recites a fan that is activated in response to an interrupt signal generated

9   when the microprocessor temperature exceeds a threshold temperature. However,

10 the fan recited in the count does not have multiple speeds of operation (e.g., a fast

11 and slow speed). Thus, the issue before us regarding feature 14 is whether claim

12 14 of Thomas '668 (the sole involved claim reciting feature 14) reciting a *multi-*

13 *speed* fan would have been obvious to one of ordinary skill in the art given the

14 count itself, which discloses a fan in general, and other applicable prior art.

15   Thomas argues that because the computer system of the count uses a single

16 threshold temperature to generate a single interrupt signal, which directs both fan

17 activation and clock frequency reduction, it is "not possible" to separate the two

18 different actions by time and temperature. Paper 29 at 20. Thomas fails to

19 explain, however, why the fan of the count's system would be incapable of

20 operating at multiple speeds. Further, the question is not what the count in

21 isolation teaches, but rather whether the involved claim would have been obvious

22 given the count and any other applicable prior art. As explained below, multi-

23 speed fans were well known in the art and a person of ordinary skill would have

24 had reason to incorporate the feature into the count's computer system. Thomas's

1   argument therefore is unpersuasive.

2   Thomas also points to testimony from Dr. McNutt identifying Neal as "the

3   closest prior art known with respect [to] the feature of fan speed and frequency."

4   Paper 29 at 20. Thomas argues that because Neal's fan is always on unless it

5   fails, Neal does not teach "fan speed control." Paper 29 at 20. Contrary to

6   Thomas's argument, however, Neal discloses using the frequency of a motor

7   pulse to drive the various speeds of a fan, thereby increasing or decreasing

8   airflow production. Neal, col. 5, ll. 31-36. Consequently, Neal not only teaches

9   fan speed control, but also teaches that the fan has multiple speeds of operation.

10   A person of ordinary skill in the art would have appreciated combining the known

11   element of controlling multiple speeds of operation in a fan, as taught by Neal,

12   with the count's computer system comprising a fan, in order to arrive at claim 14

13   of Thomas '668. This would have been nothing more than a simple combination

14   of familiar elements according to known methods that yields a predictable result.

15   *See KSR*, 550 U.S. at 416.

16   Moreover, the prior art reference cited by Pippen – Dinh – is relevant to

17   feature 14. Paper 35 at 20-21. Dinh discloses that the speed of a fan is adjustable

18   based on the temperature within the housing of a personal computer. Dinh, col. 1,

19   ll. 10-13. In particular, Dinh discloses that it is desirable to have two fan speeds –

20   low and high. Dinh, col. 1, ll. 29-35. As such, Dinh teaches a multi-speed fan

21   that can operate at low and high speeds. In addition, Dr. McNutt agreed that it

22   was known to use variable speed fans for cooling microprocessors. Paper 38 at

23   25 (admitted fact 125). A person of ordinary skill in the art would have

24   appreciated combining a multi-speed fan that can operate at low and high speeds,

1   as taught by Dinh, with the fan recited in the count to arrive at claim 14 of

2   Thomas '668. Further, a person of ordinary skill in the art would have been

3   motivated to make the combination because Dinh explicitly discloses a need in

4   the art for "a fan . . . which can increase the fan speed proportionally to the

5   increase in the temperature of [a] computer's elements." Dinh, col. 1, ll. 44-46.

6   Thomas has not met its burden to demonstrate by a preponderance of the

7   evidence that the involved claim reciting the feature of a multi-speed fan would

8   not have been obvious in light of the count and other applicable prior art.

9   *Feature 17:* Turning to feature 17, we again note that the count recites

10   activating a fan in response to an interrupt signal generated when the

11   microprocessor temperature exceeds a threshold temperature. Thus, the issue

12   before us regarding feature 17 is whether the involved claims reciting varying the

13   speed of the fan based on temperature would have been obvious to one of

14   ordinary skill in the art given the count itself, which discloses a fan in general,

15   and any other applicable prior art.

16   Thomas does not point to any prior art reference as the closest prior art for

17   purposes of feature 17 specifically (instead referring to Neal as "the closest prior

18   art known with respect [to] the feature of fan speed and frequency"). Paper 29 at

19   20. We find the prior art references cited by Pippen – Dinh and Swamy –

20   relevant to feature 17. Paper 35 at 20-22. Dinh discloses adjusting the speed of a

21   fan based on the temperature within a personal computer housing. Dinh, col. 1, ll.

22   10-13. To provide an efficient tradeoff between fan speed and noise, Dinh

23   increases the fan speed "proportionally to the increase in the temperature." Dinh,

24   col. 1, ll. 44-51. Swamy discloses repeatedly measuring the temperature of a

1 central processing unit and increasing the fan speed to cool the processor if the

2 temperature remains high.   Swamy, col. 7, ll. 10-12, 34-41 ("For example, the

3 signal may instruct the fan 240 to turn on or increase speed if already on."); col.

4 2, ll. 40-49.

5   Thomas has not presented sufficient and credible evidence demonstrating

6 that in light of the count, Dinh, and Swamy, the involved claims reciting the

7 feature of fan speed dependent on temperature would not have been obvious to a

8 person of ordinary skill in the art. A person of ordinary skill in the art would

9 have known based on Dinh and Swamy to operate the fan at multiple speeds and

10 to have the fan speed depend on temperature.[3] Doing so would have been a

11 simple and common sense modification yielding predictable results and within the

12 level of skill of an ordinarily skilled artisan. *See KSR*, 550 U.S. at 416. A person

13 of ordinary skill also would have had reason to do so to achieve an optimal

14 tradeoff between fan speed and noise and to counter persistent high temperature

15 conditions, as taught by Dinh and Swamy.

16   Further, Thomas's arguments regarding the prior art are not persuasive.

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[3] Pippin argues that the involved claims reciting feature 17 would be anticipated
by the count because it "activate[s]" a fan in response to a temperature signal (i.e.,
goes from a speed of zero to a speed above zero). Paper 35 at 18-19. The
involved claims of Thomas '235 reciting feature 17, however, recite that the "fan
is *operable* in a plurality of different speeds," and the involved claim of Thomas
'668 recites that "when said thermal manager *activates* said fan, the speed of said
fan is dependent on the temperature indication." A person of ordinary skill in the
art would not understand a fan to be *operating* or to have been *activated* when the
fan has a speed of zero. Thus, we do not agree that the involved claims reciting
feature 17 are anticipated by the count. Nevertheless, as explained herein,
Thomas has not shown that the claims would have been nonobvious.

Thomas again asserts that the count's computer system activates a fan based on a single interrupt signal, Paper 29 at 20, but does not explain *why* such functionality would preclude a person of ordinary skill in the art from modifying the system to have a multi-speed fan with fan speed dependent on temperature. In addition, Thomas fails to account for other prior art like Swamy, which takes periodic measurements of processor temperature and increases fan speed based on the changing temperature. Swamy, col. 7, ll. 10-60.

Thomas has not met its burden to demonstrate by a preponderance of the evidence that the involved claims reciting the feature of fan speed dependent on temperature would not have been obvious in light of the count and other applicable prior art.

CONCLUSION

For all of the foregoing reasons regarding the above-identified claim features, Thomas has not satisfied its burden of proof in showing that it is entitled to the relief requested, i.e., to have claims 24 and 25 of Thomas '557, claims 24-36, 41, 42, and 46-54 of Thomas '235, and claims 1-5, 12-23, and 37-52 of Thomas '668 designated as not corresponding to the count.

Thomas's Motion 1 is *denied*.

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